

The impact of knowledge management capabilities and processes on SME performance

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Abstract

Knowledge management (KM) is a practice where knowledge is captured, distributed and utilized effectively, leading to enhanced productivity and performance of an organization. The prime objective of this study is to examine the influence of KM processes and capabilities on the performance of small and medium-sized enterprises (SMEs) in Saudi Arabia. KM capabilities comprise people, IT, the organizational structure and the organizational culture, which are measured in this research by T-shaped skills, IT support, the level of centralization, and learning. The other dimension is KM processes, which consist of accessing, generating, embedding, representing, facilitating, using, measuring and transferring knowledge. Moreover, KM performance is measured via two factors: the organization's financial performance and customer satisfaction.

The research reviews previous literature related to the KM components (processes, capabilities and performance) to develop the research model and a number of hypotheses to evaluate the research problem. The data is collected through a questionnaire-based survey completed by a total of 126 managers working in different sectors of Saudi SMEs. With the help of a number of statistical tests, the research study found that the KM capabilities, IT support, learning culture, decentralized structure and the people of the organization contribute to the success of KM practices or processes, validating the theoretical model. The results also show that KM processes, including accessing, generating, measuring, transferring, use, embedding, representing and facilitating, are positively associated with the performance of SMEs in Saudi Arabia.

Key words: knowledge management; IT support; Saudi Arabia; organizational culture; learning; performance.

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Introduction

The concept of knowledge management (KM) originated in 1990s and emphasized management of knowledge and information holistically in an organization.

The process where knowledge is captured, distributed and utilized effectively is designated as KM [1]. It is an integrated approach to recognize, store, assess, retrieve and share/disseminate all the information assets of an

organization. The information assets consist of procedures, policies, documents, databases, and uncaptured experience and expertise possessed by individual workers [2].

The main purpose of knowledge management (KM) in organizations is to enhance productivity and performance through acquiring, using or applying knowledge, converting it into useful forms, and embedding it by systematic and intentional methods in the organization's routine. To understand the concept of KM, it is essential to know the organization's innovation process, where individuals explore creative problem-solving methods. The new marketplace's dynamic nature has originated an incentive or a competitive need to reconcile and consolidate knowledge assets to create sustainable value. Many companies around the world are introducing extensive KM practices to achieve competitive sustainability [3].

The relationship between KM performance, processes and capabilities has been examined by most of the studies such as [4] and [5]. Some studies emphasized the linkage between KM capabilities and processes, while others focused on the association between organizational performance and capabilities [6; 7]. However, very few empirical studies have been conducted with respect to an integrative framework related to KM. Lee and Choi [4] based on relevant theories, stressed the integrative approach of the variables related to KM and presented a framework which includes organizational performance, intermediate outcomes, KM processes and enablers. It is important to identify and assess various factors within an organization that are essential for performance measurement of KM with a balanced view. This provides a better understanding of success and failure and KM.

This research study investigates the structural relationships among different KM value chain factors: KM capabilities, KM processes and small and medium enterprises' (SMEs) performance. For this purpose, the research study is divided into two phases. The first phase consists of reviewing the literature on KM performance, processes, and capabilities to evaluate the core

KM value chain constructs, and suggests the KM's integrated framework. The second phase conducts a survey among SMEs in Saudi Arabia in order to examine this framework.

Similar research has been performed by Lee and Lee [7] to investigate the structural relationships between KM capabilities, KM processes and organizational performance. However, the current study investigates these relationships in different contexts. It is well known that the organization's size has an effect on its operations and decisions, thus it is argued that the results that have been found in large organizations could be different from SMEs. Moreover, little research has been conducted in the Saudi context, which has a different culture and regulations that can influence organizational activities and practices. This research contributes to the KM literature in the Saudi SME context by answering the following question: "to what extent do KM processes and capabilities have an influence on SME performance in Saudi Arabia?"

1. Review of the literature

This section presents a review of existing literature on the research components: KM capabilities, KM processes and organizational performance.

1.1. KM capabilities

For effective competition, organizations should leverage their existing knowledge and create new knowledge. Based on the organization's ability to manage their existing and new knowledge, their position in the market can be determined. The task requires organizations to develop the ability to use their previous knowledge, all of which facilitates recognition, assimilation and application of new information to create new capabilities and knowledge [8]. For effective KM, previous research studies have suggested that the KM capabilities are organizational resources or preconditions [3; 4; 9–11].

According to Krogh, Nonaka and Aben [12], the infrastructure of KM can be defined as the

mechanism of an organization to create knowledge intentionally and constantly. Their study explained five factors of KM infrastructure, which consist of (a) human resources; (b) employees' relationships; (c) the organizational structure; (d) conversation between employees; and (e) the will to generate knowledge. Quinn [8] stated that in order to utilize the organizational knowledge assets, organizations must perform many activities such as developing a systematic organizational structure, developing technological capabilities and employees' abilities.

Gray [11] has found that the alignment between the organizational KM practices, knowledge creation, knowledge storage and retrieval can positively influence organizational performance. According to Gray [11], KM practices consist of (a) construction of a knowledge repository; (b) formal training; (c) talk rooms of research and development of employees related to the present tasks; (d) communities of practices; and (e) informal knowledge fairs.

An empirical exploration for the KM model that views KM from the capabilities perspective is performed by Gold, Malhotra, and Segars [3]. This model suggests that there are some essential preconditions for KM effectiveness such as a knowledge infrastructure (organizational culture, structure and technology) and knowledge processes (knowledge acquisition, transformation, application, and conservation). Lee and Choi [4] discussed KM capabilities and processes, and explained that the management of knowledge within an organization consists of knowledge processes and the enablers which support and maintain these processes. According to them, the KM enablers (capabilities) consist of IT support, people and the organizational structure and culture.

1.2. KM processes

KM processes are addressed by a number of works in the literature and research which classified the concept of KM into a number of processes [3; 4; 13–15]. The researchers have iden-

tified various key processes such as knowledge acquisition, knowledge transfer, knowledge creation, knowledge integration, knowledge exploitation and knowledge capturing [16–19].

For instance, Alavi and Leidner [20] discussed KM processes as creation, transfer, storage and application. Gold, Malhotra, and Segars [3] grouped/assembled a number of capabilities into the four main processes: knowledge acquisition, knowledge conversion, knowledge application and knowledge protection.

In another study, Lee and Choi [4] explored only knowledge creation, utilizing the Nonaka and Takeuchi [21] SECI model (socialization, externalization, combination and internalization). Another classification for KM processes was introduced by Ruggles [22] as:

- ◆ generating new knowledge and using external valuable knowledge;
- ◆ using incentives and developing a culture to facilitate knowledge growth, and documenting knowledge through software, databases and documents;
- ◆ routinizing the accessible knowledge and embedding it within organization norms and procedures;
- ◆ disseminating the existing knowledge and determining its impact and value on the organization.

1.3. Organizational performance

Among the management activities, performance measurement is considered to be one of the most important areas. The measurement of performance becomes the basis of achievement and establishment of strategy within the organization, because it evaluates how successful the organization is in achieving its strategic targets and communicating its vision to its stakeholders. The conventional tools of performance measurement, which mainly include financial reporting, enable organizations to compare their performance with others. However, these financial indicators are not the only indicators

that can measure the organization's performance. Intangible assets such as knowledge play a vital role, apart from tangible assets in determining the growth and worth of organizations. Therefore, there were many attempts to measure organizational performance based on their tangible and intangible assets [4; 6; 23–27].

In a research study conducted by Sveiby [28] to assess organizational performance, an intangible asset monitor (IAM) was established. This IAM is used to measure intangible assets' performance, which include market, structural, and human capital. These performance indicators presented by the intangible asset monitor are simple and plain, and it classifies intellectual capital by external and internal structure and employee capabilities. It further provides three performance indicators: stability, efficiency and innovation/growth.

One of the most known performance measurements at strategic level tools is called the balanced scorecard (BSC). This was developed by Kaplan and Norton [24]. The BSC measures organizational performance based on four main perspectives: financial perspective, customer perspective, internal processes perspective, and innovation and learning perspective. Previous research studies have measured organizational performance with respect to market share, business size, innovativeness, growth rate, profitability and success from a subjective point of view, in comparison with the key competitors, to consider both operational and financial issues.

Arora [23] evaluated the purposes of KM, which include enhancement of employees' jobs through extended cooperation, innovation or creation of new knowledge. To support overall KM, Arora proposes communities of practice activations and construction of a knowledge repository. Gooijer [25] also discussed the importance of KM and proposed a methodology to measure organizational performance by introducing KM balanced scorecards. According to Gooijer, KM is a practice that enhances integration, collaboration and cooperation among employees.

2. Research model

This section discusses the main variables based on our review of the literature and identifies the major factors related to KM capabilities and processes. It further presents our research hypotheses.

2.1. Variables

2.1.1. KM capabilities

The KM capabilities incorporated in the study model include information technology (IT), organizational culture, organizational structure and people. The research study proposes that KM is influenced by IT and its capabilities. In this era of increasing innovation, the use of IT plays a crucial role for the success of any organization. IT is employed widely to establish networks or channels for people to connect and reuse the codified knowledge. IT also plays a significant role in creation of new knowledge by facilitating conversation and enabling sharing, using and storage of knowledge [29]. This study therefore focuses on the capability of IT in the form of *IT support*, which is an essential part of the KM function.

For successful KM, the organizational culture also plays an important role. The organizational culture determines the organization's values and norms, and it is often considered as the most significant factor in KM success. The culture of sharing knowledge within an organization is beneficial for long-term success, which is associated with organizational learning. Thus, this research study focuses on the organization's *learning* as the dimension for organizational culture.

The third important factor is the organizational structure, which may inhibit or encourage the KM function. The impact of the organizational structure on KM is widely recognized [30]. In this research study, the structure of an organization is measured by the degree of *centralization*, which is a key structural factor and signifies the concentration of decision-making and control within the organization.

People are the key factor in an organization to create and share knowledge, and they are therefore crucial to be managed effectively. Organizations acquire competences and knowledge by recruiting new members/people with the required and unique skills desired by the organization. Particularly, the employees **T-shaped skills** are considered as part of the core capabilities. In the individual specialist, these skills may enable synergistic conversation within the organization.

2.1.2. KM processes

Previous studies have acknowledged the processes and capabilities of KM as the antecedents for organizational performance. However, literature has also identified the organization's capabilities as knowledge process preconditions. Therefore, it is essential to understand the impact of an organization's capabilities on its KM processes. Considering KM processes as essential in the organization is based on the process-based view.

This research study adopts eight processes of KM to examine their role as proposed by Ruggles [22]: knowledge generation (**generating**), accessing external knowledge (**accessing**), facilitation of knowledge growth (**facilitating**), knowledge documentation (**representing**), knowledge embedment in processes and routine (**embedding**), knowledge use in decision making (**usage**), knowledge transfer among organization (**transferring**) and measurement of knowledge impact and value (**measuring**).

2.1.3. SME performance

The behavior of employees and managers is strongly affected by measuring organizational performance. From the KM perspective, the performance of an organization can be measured by a number of methods, which can be categorized into balanced scorecard, intangible benefits, intellectual capital and financial measures. According to Kaplan and Norton [24], as compared to the tangible or intangible measurement approaches, and the intellectual capital approach, the balanced scorecard method is more beneficial and useful, since it provides the cause and effect associations between organization strategies and knowledge components.

For measuring organizational performance, this research study has adopted a modified method of the balanced scorecard which focuses on measuring customer satisfaction and financial outcomes, following the same approach of Lee and Lee [7].

The diagram below (*Figure 1*) presents the research model. The KM capabilities comprise people, IT, organizational structure and organizational culture, which are represented by IT support, centralization, T-shaped skills and learning. KM processes according to this model consist of accessing, generating, embedding, representing, facilitating, usage, measuring and transferring knowledge. Moreover, KM performance is divided into the organization's **financial performance** and **customer satisfaction**.

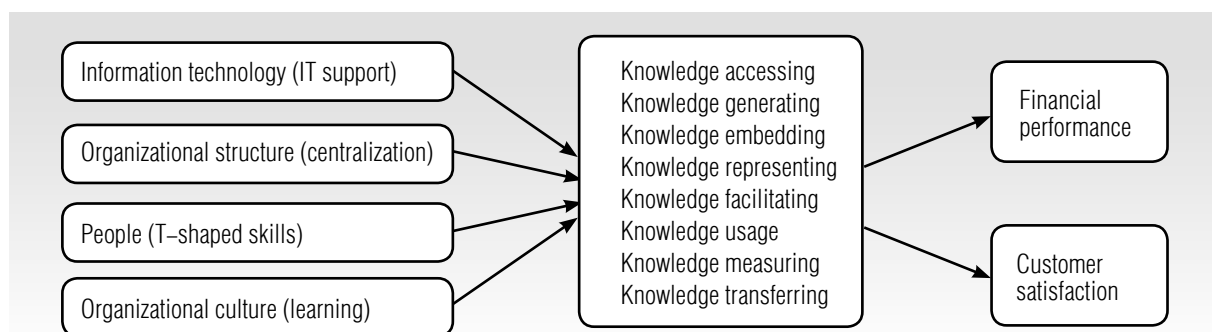


Fig. 1. The research model

2.2. Hypotheses

The research hypotheses are derived from the review of the literature review based on the theoretical statements on KM. The following hypotheses relate to information technology support, learning, centralization, T-shaped skills, and performance of the organization.

2.2.1. T-shaped skills

According to Leonard-Barton [31], the T-shaped skills are both broad and deep, as indicated by the shape of the letter 'T' with its horizontal and vertical parts. As discussed before, the research study has considered the T-shaped skills to measure the KM capabilities' variable – people. The processors of the T-shaped skills can explore particular knowledge domains. For creating new knowledge, the employees/people having T-shaped skills are considered very useful, because of their ability to integrate different knowledge assets.

The people with T-shaped skills can combine both practical and theoretical knowledge, and have the ability to observe how the interaction among different branches of knowledge takes place. Therefore, across several functional areas, they have the ability to expand their competence and create new knowledge. Hence the related hypothesis for the T-shaped skills is:

Hypothesis 1: *There is a positive association between KM processes and the T-shaped skills of the members of an organization.*

2.2.2. Centralization

In this research study, the structure of the organization is measured by the degree of centralization. Centralization in an organization hinders frequent sharing of ideas and interdepartmental communication, due to consumption of time in the communication channels, and results in discontinuousness and distortion of ideas [32].

In contrast, an organization with a decentralized organizational structure facilitates knowl-

edge sharing, where employees tend to participate more in the process of knowledge building. In this kind of working environment, less emphasis is required on the work rules, and the knowledge processes need more flexibility. Therefore, in an organizational structure, increased flexibility may contribute to activated KM practices. The hypothesis for the organizational structure would be:

Hypothesis 2: *There is a negative association between KM processes and the degree of centralization.*

2.2.3. IT support

This explains the degree to which the use or implementation of information technology in an organization supports KM. A number of research works have found an important association between IT use and efficient KM processes, i.e. IT is an essential component of KM [3]. IT enables organizations to collect, exchange and store knowledge rapidly and on a huge scale. Furthermore, the fragmented flows of knowledge are integrated with a well-developed technology. The integration can eliminate communication barriers among various departments. All forms of knowledge processes are supported by IT; these include generation, transferring, usage, facilitating, etc. Therefore, the hypothesis for IT support is:

Hypothesis 3: *There is a positive association between KM processes and IT support.*

2.2.4. Learning

Acquisition of new knowledge is often observed learning by the members of an organization who are willing and able to apply the knowledge in the decision-making process. A learning culture should be developed and various learning means should be provided such as mentoring, training and education within organizations for efficient knowledge processes. Learning not only boosts the efficiency of KM processes but also contributes to the performance and success of

an organization. Therefore, the hypothesis for learning culture is:

Hypothesis 4: *There is a positive association between KM processes and learning.*

2.2.5. Performance of the organization

The performance of an organization, in this research study, is measured by the balanced scorecard’s financial and customer perspectives as compared to key competitors. The organizational change goals typically include various aspects of performance of an organization including innovation, improvement, survival or effectiveness. The organizational performance can be regarded as the knowledge processes’ output that encourages and improves these aspects. This means that the improvement in knowledge processes contributes to its performance. Therefore, the hypotheses are:

Hypothesis 5: *There is a positive association between financial performance and KM processes;*

Hypothesis 6: *There is a positive association between customer performance and KM processes.*

3. Methodology

The research approach of the study is a quantitative research approach, which tends to explore the research issues by using statistical models, functions and techniques. In this study, the impact of KM processes and capabilities on KM performance is explained with a ‘correlational research design’ and a ‘descriptive design’. Bordens [33] explains that in a correlational design, the variables are measured and the association between them is defined. The descriptive research design here adopts a questionnaire based survey.

The questionnaire was filled out by a total of 126 SME managers working in different sectors; therefore, the data collection source is a primary, where data is directly collected from the respondents.

For all variables/constructs, multiple-item measures were developed. To enhance the confidence of accurate assessment and consistent measurement of the variables or constructs of interest, multiple-item measure was used. They are also used in the measurement process to enhance the validity and reliability of the measures. Moreover, the constructs related to KM processes, capabilities and performance were measured using a 5-point Likert scale.

The questionnaire for the research study was adopted from Lee and Lee [7]. It consists of a total of 34 items related to KM capabilities, processes and performance. The capabilities of KM comprise employees’ IT support, the learning organization culture, centralization of the structure and T-shaped skills as shown in *Table 1*.

Table 1.

KM capabilities items

Variables	Items
Information technology (IT support)	Information sharing via Intranet
	Knowledge map for knowledge source
	Use of customer relationship management (CRM)
	Use of data warehouse
Organizational culture (learning)	IT support for information acquisition
	Clubbing and community gatherings
	Contents of job training
	Encouragement to attend seminars, etc.
Organizational structure (centralization)	Informal individual development
	Formal training programs
	Making decisions without approval
	Supervisor's permission to act
People (T-shaped skills)	Need to refer to others
	Making own decisions
	Acting without supervisor's consent
	Knowing core knowledge
People (T-shaped skills)	Employees expert in their tasks
	Employees can explain their task
	Employees having accurate know-how

The processes of KM consist of accessing, generating, using, inserting, representing, facilitating, measuring and transferring knowledge that are eight items as represented in *Table 2*.

Table 2.

KM processes items

Variables	Items
KM processes	Accessing valuable knowledge
	Using knowledge that is accessible in decisions
	Embedding knowledge in processes
	Representing knowledge in documents, etc.
	Facilitating growth of knowledge
	Generating new knowledge
	Determining the knowledge assets' value
	Transferring existing knowledge

The financial and customer performance of the SMEs was measured using the KM scorecard to enable the research study to examine the performance of the organization based on a balanced scorecard. The study used cognitive measures for measuring the financial and customer performances, because it is difficult to relate metric financial data (e.g. ROI, ROA, profits) with the KM initiatives. The performance variables and their items are presented in *Table 3* as compared with key competitors.

Table 3.

Performance items

Variables	Items
Financial performance	Greater economic value added
	Greater net profit
	Greater market share
	Greater return on investment
Customer performance	More customer retention
	More customer acquisition
	Greater customer satisfaction

4. Empirical analysis

4.1. Descriptive analysis

In the descriptive analysis, the related industries of the respondents are illustrated in *Table 4*.

Table 4.

Industry analysis

Industry	Frequency	Percent
Wholesale and retail	32	25.4
Consulting and business service	25	19.8
Real estate	21	16.7
Service industry	15	11.9
Information and communication	12	9.5
Construction and engineering	9	7.1
Banking and insurance	9	7.1
Petrochemicals	3	2.4
Total	126	100.0

According to the table, the highest percentage of respondents is from the wholesale and retail industry, which is equal to 25.4 percent, followed by the consulting and business service and the real estate sector, with a percentage of 19.8 and 16.7 respectively. The data shows that the respondents from the petrochemical industry are the lowest, i.e. only 2.4 percent.

Table 5 shows the percentage of departments to which the participants belong. Most of the respondents are from the Accounting and Finance Department that is 57.1 percent, which is followed by Personnel Management and Training, and Production Departments (10.3 percent and 9.5 percent respectively). The other departments participating in the study include Marketing, Management Information System, Research and Development, General Affairs, Planning and others.

4.2. Reliability analysis

The research study tested the basic assumption related to the items to measure the vari-

ables – IT support, learning organization, centralization, T-shaped skills, knowledge processes, financial performance and customer performance. It is also important to test reliability or consistency of the test/survey. For determining reliability, Cronbach’s alpha test was applied on the extracted factors (*Table 6*).

Table 5.

Participants by departments

Departments	Frequency	Percent
Accounting and Finance	72	57.1
Personal Management and Training	13	10.3
Production	12	9.5
Marketing	7	5.6
Others	7	5.6
Management Information System	5	4.0
Research and Development	4	3.2
General Affairs	3	2.4
Planning	3	2.4
Total	126	100.0

According to *Table 6*, the value of Cronbach’s alpha for each construct is higher than the assumed threshold of 0.6. Therefore, the internal consistency is acceptable.

4.3. Validity assessment

To test the validity of the items adopted by the research study, construct validity, content validity and criteria-related validity was performed.

4.3.1. Content validity

In this type of validity analysis, we observe to what extent the specific intended content domain is reflected by the measurement. In the research study, the degree of correspondence between the observed items and the conceptual definitions (financial performance, customer performance, knowledge processes, IT support, learning, centralization, and T-shaped skills) is high. The content validity in the research study is recognized by the extensive analysis of previous KM practices.

4.3.2. Construct validity

In this form of validity, the agreement between a specific measuring procedure or device and a theoretical concept is determined. The significance of construct validity is high in a theoretical research. For a research study, three steps should be followed to determine the construct validity. In the first step, it is important to specify the theoretical relationships, which is followed by an evaluation of the empirical relationships

Table 6.

Reliability analysis

	Variables	Numbers of items	Cronbach’s alpha
KM processes	Accessing, generating, representing, facilitating, measuring, transferring, using, embedding	8	0.921
KM capabilities	IT support	5	0.901
	Learning organization	5	0.926
	Centralization	5	0.897
	T-shaped skills	4	0.851
KM performance	Financial performance	4	0.931
	Customer performance	3	0.891

between the concepts' measures. Lastly, interpretation of the empirical evidence is crucial to clarify the construct validity. The construct validity in the research study is tested using confirmatory factor analysis.

As discussed before, the items used and developed in the research model relating to the different constructs were adopted from a previous research model and theoretical evidence. The confirmatory factor analysis, in the construct development from theory-driven approach, delivers the appropriate method to evaluate the consistency of the structural equation model and the efficacy of measurement. Therefore, it is expected that the associated factors with the developed scales will be uniquely measured and the system of relationships will be represented by a system of factors. In this way, measurement efficacy is provided and the likelihood of confusion is reduced in structural equation modelling.

To examine the measurement strength between the constructs and the associated items, the study estimated three types of measurement models. The first model of measurement evaluates the relationships system among the KM capabilities' measures – IT support, learning, centralization and T-shaped skills (Table 7). The measures of KM process and the system of relationship among them are examined by the second measurement model (Table 8). KM performance measures (financial and customer performance) and the system of relationships

are examined by the third measurement model (Table 9). The following statistical metrics were used: chi-square, *p*-value, root mean square residual (RMR), confirmatory fit index (CFI), non-normed fit index (NNFI), normed fit index (NFI), adjusted goodness of fit index (AGF), goodness of fit index (GF).

According to Table 7, the chi-square values of the four constructs of KM capabilities are significant with the *p*-values less than 0.05 threshold, indicating a good model fit. The non-normed fit index (NNFI), normed fit index (NFI), adjusted goodness of fit index (AGF) and goodness of fit index (GF) are all very high, which suggests the goodness of model fit. This shows that a significant amount of variation is captured by each scale in these KM capabilities' latent dimensions.

According to Table 8, the chi-square value is equal to 112.29, which is significant with the *p*-values less than 0.05 thresholds. The non-normed fit index (NNFI), normed fit index (NFI), adjusted goodness of fit index (AGF), and goodness of fit index (GF) are high, suggesting the goodness of model fit.

In Table 9, the third measurement models are presented related to the two KM performance measures. According to the statistics, chi-square values of the two variables are significant (0.05 significance level). The NNFI, NFI, AGF and GF indices are high and deducing good model fit. Therefore, in this section, the construct validity was verified using the confirmatory factor analysis.

Table 7.

KM capabilities measurement model

	IT support	Learning culture	Centralization	T-shaped skills
Chi-square	18.91	29.11	25.09	14.119
P-value	0.002	0.000	0.000	0.010
RMR	0.029	0.049	0.029	0.033
CFI	0.913	0.982	0.970	0.969
NNFI	0.982	0.972	0.897	0.952
NFI	0.982	0.945	0.971	0.966
AGF	0.948	0.838	0.901	0.913
GF	0.955	0.898	0.972	0.928

Table 8.

KM processes measurement model

	Knowledge processes
Chi-square	112.29
P-value	0.000
RMR	0.061
CFI	0.911
NNFI	0.812
NFI	0.902
AGF	0.851
GF	0.882

Table 9.

KM performance measurement model

	Financial performance	Customer performance
Chi-square	7.912	4.123
P-value	0.019	0.036
RMR	0.021	0.029
CFI	0.962	0.945
NNFI	0.971	0.967
NFI	0.989	0.978
AG	0.912	0.901
GF	0.978	0.992

4.3.3. Criteria-related validity

In this form of validity, we have the degree to which future performance is predicted by the performance in an assessment i.e. the predictive capability. For instance, the degree to which KM performance is estimated accurately by the KM processes indicates the criteria-related validity.

In this research study, correlated analysis was conducted with the summated scale variables (KM capabilities – IT support, learning, centralization and T-shaped skills, KM processes, and the customer and financial performance). The summated scale’s purpose is to raise the representative nature of constructs and to reduce measurement error. In this analysis, the higher value of mean suggests agreement on the constructs’ definition. Table 10 illustrates the constructs’ correlation analysis using a summated scale.

4.4. Factor analysis

The research study conducted an exploratory factor analysis, using the principle components method for the seven variables (IT support, learning organization, centralization, T-shaped skills, knowledge processes, financial performance and customer performance) to reduce and summarize the number of items.

Table 10.

Correlation coefficients matrix with mean and standard deviation

Variables	Mean	Standard deviation	T-shaped skills	Centralized structure	Learning culture	IT support	KM processes	Customer performance	Financial performance
T-shaped skills	0.32	0.42	1.000	0.254	0.306	0.236	0.289	0.181	0.082
Centralized structure	0.63	0.87	0.254	1.000	0.409	0.184	0.451	0.077	0.057
Learning culture	0.12	0.58	0.306	0.409	1.000	0.344	0.701	0.125	0.037
IT support	0.24	0.46	0.236	0.184	0.344	1.000	0.598	0.056	0.282
KM processes	0.07	0.48	0.289	0.451	0.701	0.598	1.000	0.137	0.106
Customer performance	0.12	0.55	0.181	0.077	0.125	0.056	0.137	1.000	0.258
Financial performance	0.00	0.73	0.082	0.057	0.037	0.282	0.106	0.258	1.000

The tests (*Table 11*) are performance to test the appropriateness of the data for factor analysis. The KMO value equals 0.771, which measures the sampling adequacy. Since the value is above 0.6 (the assumed minimum criteria), the sample is considered to be adequate for the principle components method. The Bartlett’s test is showing a sig. value less than 0.05, indicating the appropriateness of running factor analysis.

Table 11.

KMO and Bartlett’s test to measure appropriateness

KMO measure of sampling adequacy		0.771
Bartlett's test of sphericity	Approx. chi-square	7353.154
	df	561
	Sig.	0.000

Table 12 shows the results from the rotated component matrix, which is extracted using the principle component method. The correlated individual items related to the seven variables placed in their specific components based on the extraction. The KM process items, the KM capabilities and the performance related items are summarized and grouped into the seven components.

4.5. Structural equation model

In the formation of the research model, it was assumed that the capabilities of KM impact the processes, which may then influence the KM performance. As conceptualized in the previous chapters, the information technology capabilities, structure, culture, and people predict and influence the knowledge processes within an organization, whereas, the knowledge processes’ distinct causal paths predict the performance (financial and customer perspectives).

Table 13 shows that the model’s chi-square value is 890.12, which is highly significant. The values of NNFI, NFI, adjusted goodness of fit (AGF) and goodness of fit (GF) indices also meet recommended levels.

Table 12.

Rotated component matrix

	Components						
	1	2	3	4	5	6	7
P1	0.982	0.056	-0.033	-0.064	0.047	-0.079	0.014
P2	0.953	0.020	-0.021	-0.083	0.023	-0.057	0.016
P3	0.961	0.053	-0.030	-0.103	0.056	-0.037	-0.009
P4	0.923	0.008	-0.001	-0.062	0.072	0.009	0.042
P5	0.952	0.073	-0.023	-0.084	0.039	-0.073	-0.020
P6	0.952	0.103	-0.042	-0.046	-0.019	-0.018	0.021
P7	0.949	0.120	-0.040	-0.066	-0.005	-0.049	0.015
P8	0.883	0.001	-0.056	-0.045	0.028	-0.089	0.161
C1	0.071	0.977	0.113	-0.082	0.018	-0.034	0.075
C2	0.079	0.966	0.104	-0.082	0.013	-0.011	0.085
C3	0.088	0.947	0.110	-0.114	0.048	-0.074	0.046
C4	0.010	0.955	0.089	-0.113	-0.027	-0.051	0.033
C5	0.075	0.968	0.112	-0.089	0.024	-0.037	0.057
L1	-0.015	0.107	0.968	-0.021	-0.011	0.121	-0.001
L2	-0.015	0.113	0.971	-0.047	-0.014	0.109	-0.002
L3	-0.015	0.098	0.965	-0.021	0.005	0.121	0.004
L4	-0.072	0.119	0.932	-0.048	-0.043	0.064	-0.014
L5	-0.055	0.078	0.948	-0.084	-0.049	0.072	0.022
T1	-0.115	-0.110	-0.042	0.974	-0.012	-0.035	-0.043
T2	-0.112	-0.089	-0.046	0.961	0.006	-0.034	-0.068
T3	-0.097	-0.122	-0.057	0.955	0.002	0.028	-0.021
T4	-0.095	-0.125	-0.065	0.956	-0.035	-0.031	0.012
S1	0.325	-0.134	0.121	0.069	0.635	-0.047	0.036
S2	0.046	0.001	-0.033	-0.038	0.955	0.065	0.047
S3	0.031	0.033	-0.023	-0.022	0.950	0.018	0.011
S4	0.036	0.024	-0.065	0.001	0.883	0.077	0.040
S5	0.018	0.070	-0.038	-0.015	0.944	0.006	0.017
FP1	-0.083	-0.021	0.106	0.051	0.055	0.919	-0.102
FP2	-0.117	-0.134	0.089	-0.070	0.034	0.895	-0.068
FP3	-0.099	-0.028	0.101	-0.034	-0.002	0.951	-0.062
FP4	-0.014	-0.009	0.152	-0.017	0.060	0.893	-0.119
CP1	0.092	0.129	0.033	-0.045	0.069	-0.136	0.940
CP2	0.050	0.113	-0.003	-0.024	0.022	-0.131	0.917
CP3	0.033	0.014	-0.016	-0.038	0.037	-0.064	0.887

Table 13.

The hypothesized model fitness

Chi-square = 890.12
P-value = 0.000
RMR = 0.066
CFI = 0.912
NNFI = 0.891
NFI = 0.854
AGF = 0.789
GF = 0.801

The estimated model’s path coefficients support the theorized associations in magnitude and direction (Table 14). This implies that KM capabilities (IT support, learning culture, decentralized structure and the people of the organization) contribute to the success of KM practices or processes. Meanwhile, successful KM processes enhance the performance of the SMEs in Saudi Arabia.

Table 14.

Hypothesis test results

Hypotheses/Relationships	t-value	Path coefficients
T-shaped skills and KM process	4.712	0.355
Centralization and KM process	-3.799	-0.208
IT support and KM process	4.839	0.368
Learning culture and KM process	5.015	0.349
KM process and financial performance	9.320	0.745
KM process and customer performance	4.991	0.469
Financial and customer performance	3.201	0.291

It is important to explain that the theoretical perspective developed in previous sections is consistent with the relationships’ mathematical manifestation. A more precise aspect is the contribution of these results and the resultant associations. Although the chi-square values (model fits) are observed to be moderate in strength, the fit measures should be balanced with the complexity of the model.

The item loadings strength, directional path consistency, and the theory match imply that the proposed model of the research study provides valid insight into the KM process, capabilities and the organizational performance in Saudi Arabia.

Conclusion

The objective of this research study was to examine the influence of KM processes and capabilities on the performance of SMEs in Saudi Arabia. The study for this purpose reviewed previous literature on the subject and adopted a quantitative research approach, with an explanatory purpose to examine the research problem. The study has focused on the analysis and discussion of capabilities related to KM, to examine its impact on the facilitation of knowledge process leading towards greater competitiveness of an organization.

The research conducted a questionnaire-based survey of 126 respondents related to different sectors. With the help of a number of statistical tests, the research study found that that the KM capabilities (IT support, learning culture, decentralized structure and the people of the organization) contribute to the success of KM practices or processes, validating the theoretical model. The results also show that the KM processes, including accessing, generating, measuring, transferring, usage, embedding, representing and facilitating, are positively associated with the performance of SMEs in Saudi Arabia.

The research study provides strong evidence regarding the impact and association of KM processes and capabilities with performance on organizations (SMEs). However, there are a few limitations related to the study, which include the cross-sectional design of the study overlooking time-lag effects. It is recommended that future researchers perform a longitudinal study for further robust results. The research was focused on some small and medium firms in Saudi Arabia, so it is difficult to generalize the results over the whole population. ■

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